

Abrar Zahin

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PERSONAL SUMMARY

I have five years of application-driven research experience in data mining and machine learning for networked systems. I am skilled in clustering, classification, fault detection, and the (underlying) structure recovery of such systems, using various deep learning algorithms and probabilistic modeling. Additionally, I am well-versed in (statistically) analyzing existing machine learning algorithms to enhance their performance with theoretical guarantees. I am eager to continue utilizing and developing different data mining algorithms to solve real-world industry problems.

PROFESSIONAL EXPERIENCE

- **Research Assistant**, Arizona State University
 - *Active and Sequential Model Selection of Graphical Models*: Interconnected systems are prevalent in various real-life applications, presenting a significant research challenge: unveiling the structure from generated measurements. My research focuses on developing query and runtime-effective machine learning algorithms, employing probabilistic graphical models, to understand the structure of such systems.
- **Research Assistant**, Utah State University
 - *Big Data Management for Secured Smart Healthcare System: A Machine Learning Framework*: I developed machine learning algorithms tailored to improve smart healthcare systems within an Internet of Things (IoT) framework. The developed algorithms exhibit the capacity to effectively manage substantial volumes of data generated within IoT ecosystems.
- **Instructor**, Utah State University
 - I served as an instructor for two wireless communication-based courses at Utah State University. In this role, I taught various communication-related concepts and assisted them in building different communication-related Matlab software.
- **Assistant Engineer**, Energypac Engineering Limited
 - Provided comprehensive support to contracts engineers and commercial team, optimizing collaboration within the tendering process. Conducted in-depth requirement discussions with clients and industry experts, while delivering precise reports to clients, public agencies, and planning entities, ensuring meticulous project correspondence.

EDUCATION

- **Arizona State University** Tempe, Arizona
PhD, Electrical, Computer & Energy Engineering *Spring 2020 -Current*
Advisor: Prof. Gautam Dasarathy, CGPA: 3.81/4.00
- **Utah State University** Logan, Utah
Masters of Science, Electrical & Computer Engineering *November 2019*
Advisor: Prof. Rose Qingyang Hu, CGPA: 3.79/4.00
- **Islamic University of Technology** Dhaka, Bangladesh
Bachelor of Science, Electrical & Electronic Engineering *December 2014*
CGPA: 3.25/4.00

TECHNICAL SKILLS

- **Programming Language**: Python, C/C++, MATLAB, SQL, Assembly
- **Data Analytics Package**: TensorFlow, Keras, Scikit-learn, Numpy
- **Operating System**: Windows, Linux

RESEARCH INTERESTS

Recommender Systems, Probabilistic Modeling, Graph Machine Learning, Image Processing, Generative Models, Active Learning, Reinforcement Learning, Computer Vision, Multi-armed Bandits, and Deep Learning

PUBLICATIONS

- **Abrar Zahin**, Rajasekhar Anguluri, Oliver Kosut, Lalitha Sankar, Gautam Dasarathy, “*Robust Model Selection of Non Tree-Structured Gaussian Graphical Models*”.
- **Abrar Zahin**, Wezhi Li, Gautam Dasarathy, “*Rapid Change Localization in Dynamic Graphical Models*”. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2024.
- **Abrar Zahin**, Le Thanh Tan, and Rose Qingyang Hu, “*Sensor-based human activity recognition for smart healthcare: A semi-supervised machine learning*”, in international conference on artificial intelligence for communications and networks, pp. 450-472. Springer, Cham, 2019.
- **Abrar Zahin**, Le Thanh Tan, and Rose Qingyang Hu, “*A Machine Learning Based Framework for the Smart Healthcare System*”, 2021 in Intermountain Engineering, Technology and Computing (IETC).

In Preparation:

- **Abrar Zahin**, Gautam Dasarathy, “*Computationally Efficient Active Learning for Graphical Models*”.
- **Abrar Zahin**, Gautam Dasarathy, “*Learning Multiple Graphical Models using Multiplicative Weight Update*”.

RELEVANT COURSEWORKS

Random Signal Theory, Information Theory, Statistical Machine Learning, Mathematical Methods for Signals and Systems, Convex Optimization, Machine Learning for High Dimensions, Reinforcement Learning, Discrete Mathematics and Numerical Analysis, Database Concepts and Programming, Microprocessor and Assembly Language Programming, Peripherals and Microprocessor Based Design, Digital Signal Processing, Radio Frequency Engineering, Telecommunication Engineering, Advanced Communication Technique, Optical Communication, Wireless & Mobile Networking

NOTABLE PROJECT IMPLEMENTATIONS

- Implemented **Recurrent Neural Network (RNN)** and **Long Short Term Memory (LSTM)** for Electric Vehicle charging demand prediction.
- Implemented **Convolutional Neural Network** for Human Action Recognition using Actitracker Dataset.
- Implemented **Variational Autoencoder (VAE)** and **Denoising Convolutional Autoencoder** for reconstructing and denoising images, respectively.
- Implemented **Generative Adversarial Networks (GAN)** for reconstructing images.
- Implemented **Convolutional Neural Network** for Human Action Recognition.
- Implemented **Support Vector Machine** for image classification
- Implemented **Q-learning** for *Monte-Carlo Blackjack* Problem.
- A [technical report](#) exploring the computational statistical tradeoffs in structure learning of graphical models.
- A [technical report](#) on some popular structure learning algorithms for Gaussian graphical models and their theoretical guarantees.
- A [technical report](#) on the information-theoretic approach towards understanding the utility-privacy tradeoffs in databases.

PROFESSIONAL SERVICE: REVIEWER

International Conference on Machine Learning (ICML), 2023; Conference on Neural Information Processing Systems (NIPS), 2023; Artificial Intelligence and Statistics (AISTATS), 2022; Association for the Advancement of Artificial Intelligence (AAAI), 2022